

Amendments to the claims

This listing of claims will replace all prior versions and listings of the claims.

Listing of Claims:

1. (Currently amended) A liquid stereolithography resin comprising a first urethane acrylate oligomer, a first acrylate monomer, and a polymerization modifier; **wherein the first urethane acrylate oligomer is CN964, CN963, CN966, CN990, or CN973.**
2. (Original) The liquid stereolithography resin of claim 1, further comprising a photoinitiator.
3. (Original) The liquid stereolithography resin of claim 2, wherein the photoinitiator includes a phosphine oxide, an alpha-hydroxyketone, and a benzophenone derivative.
4. (Currently amended) The liquid stereolithography resin of claim 2, wherein the photoinitiator includes a component selected from the group consisting of a benzophenone, a benzil dimethyl ketal, a 1-hydroxy-cyclohexylphenylketone, an isopropyl thioxanthone, an ethyl 4-(dimethylamino)benzoate, ~~SARCURE SR1135~~ **a blend of 2,4,6-trimethylbenzoyldiphenyl phosphine oxide, 2,4,6-trimethylbenzophenone, 4-methylbenzophenone, and oligo(2-hydroxy-2-methyl-1-(4-(1-methylvinyl)phenyl)propanone,** a benzoin normal butyl ether, ~~SARCURE SR1130E~~ **a blend of oligo(2-hydroxy-2-methyl-1-(4-(1-methylvinyl)phenyl)propanone) and poly(2-hydroxy-2-methyl-1-phenyl-1-propanone),** tripropyleneglycol diacrylate, an oligo(2-hydroxy-2-methyl-1-(4-(1-methylvinyl)phenyl)propanone), a 2-hydroxy-2-methyl-1-phenyl-1-propanone, a poly(2-hydroxy-2-methyl-1-phenyl-1-propanone), a trimethylolpropane triacrylate, ~~a SARCURE SR1137~~ **a mixture of 2,4,6-trimethylbenzophenone and 4-methylbenzophenone,** ~~a SARCURE SR1130,~~ a phosphine oxide, a 4-methylbenzophenone, a trimethylbenzophenone, a methylbenzophenone, **and** a

Darocur 4265 blend of 2,4,6-trimethylbenzoyl-diphenyl-phosphineoxide and hydroxy-2-methyl-1-phenyl-propan-1-one, and an Irgacure.

5. (Currently amended) The liquid stereolithography resin of claim 2, wherein the photoinitiator includes a component selected from the group consisting of a **Darocur 4265 blend of 2,4,6-trimethylbenzoyl-diphenyl-phosphineoxide and hydroxy-2-methyl-1-phenyl-propan-1-one**, a phosphine oxide, a 2-hydroxy-2-methyl-1-phenyl-1-propanone, and mixtures thereof.

6. (Original) The liquid stereolithography resin of claim 2, wherein the photoinitiator activates polymerization of an acrylate in a wavelength range of 240 nm to 250 nm, 360 nm to 380 nm, or 390 nm to 410 nm.

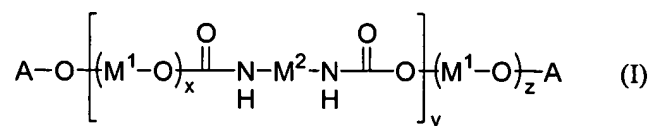
7. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer includes a polyester urethane diacrylate.

8. (Withdrawn) The liquid stereolithography resin of claim 7, wherein the polyester urethane diacrylate is an aliphatic polyester urethane diacrylate.

9. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first acrylate monomer includes a monovalent acrylate.

10. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first acrylate monomer includes a polyvalent acrylate.

11. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer has formula (I):

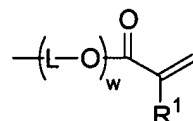


wherein

each M^1 is, independently, an alkylene, an acylalkylene, an oxyalkylene, an arylene, an acylarylene, or an oxyarylene, M^1 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each M^2 is, independently, an alkylene or an arylene, M^2 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each A, independently, has the formula:



wherein R^1 is hydrogen or lower alkyl, each L is, independently, C_1 - C_4 alkyl, and w is an integer ranging from 0 to 20, and

x is a positive integer less than 40, y is a positive integer less than 100, z is a positive integer less than 40, and w, x, y, and z together are selected such that the molecular weight of the first urethane acrylate oligomer is less than 20,000.

12. (Withdrawn) The liquid stereolithography resin of claim 11, wherein M^1 is a straight, branched, or cyclic alkylene.

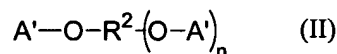
13. (Withdrawn) The liquid stereolithography resin of claim 11, wherein M^1 is an acylalkylene or acylarylene.

14. (Withdrawn) The liquid stereolithography resin of claim 13, wherein M^2 is a straight, branched, or cyclic alkylene.

15. (Withdrawn) The liquid stereolithography resin of claim 11, wherein M^2 is a straight, branched, or cyclic alkylene.

16. (Withdrawn) The liquid stereolithography resin of claim 11, wherein L is branched or unbranched C₁-C₄ alkyl.

17. (Withdrawn) The liquid stereolithography resin of claim 11, wherein the first acrylate monomer has formula (II):

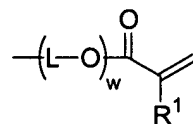


wherein

R² is a monovalent or polyvalent moiety selected from the group consisting of a C₁-C₁₂ aliphatic group, an aromatic group, and a poly(C₁-C₄ branched or unbranched alkyl ether), R² being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, aryl, or aralkyl,

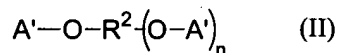
n is an integer ranging from 0 to 5, and

each A' has the formula:



wherein R¹ is hydrogen or lower alkyl, each L independently is C₁-C₄ alkyl, and w is an integer ranging from 0 to 20.

18. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first acrylate monomer has formula (II):

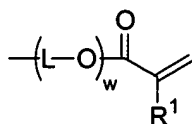


wherein

R² is a monovalent or polyvalent moiety selected from the group consisting of a C₁-C₁₂ aliphatic group, an aromatic group, and a poly(C₁-C₄ branched or unbranched alkyl ether), R² being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, aryl, or aralkyl,

n is an integer ranging from 0 to 5, and

each A' has the formula:

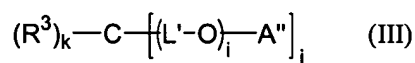


wherein R^1 is hydrogen or lower alkyl, each L independently is $\text{C}_1\text{-C}_4$ alkyl, and w is an integer ranging from 0 to 20.

19. (Withdrawn) The liquid stereolithography resin of claim 18, wherein L is branched or unbranched $\text{C}_1\text{-C}_4$ alkyl.

20. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the polymerization modifier includes a second acrylate monomer.

21. (Withdrawn) The liquid stereolithography resin of claim 20, wherein the second acrylate monomer has formula (III):



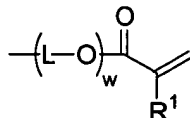
wherein

j is 1, 2, 3 or 4,

k is equal to 4-j,

R^3 is hydrogen or $\text{C}_1\text{-C}_4$ branched or unbranched alkyl, each L' independently is $\text{C}_1\text{-C}_4$ branched or unbranched alkyl, each i independently is 0, 1, 2 or 3, and

each A'' independently has the formula:



wherein R^1 is hydrogen or lower alkyl, each L independently is $\text{C}_1\text{-C}_4$ branched or unbranched alkyl, and w is an integer ranging from 0 to 20.

22. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the polymerization modifier includes a second urethane acrylate oligomer.

23. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the polymerization modifier is selected from the group consisting of a trimethylolpropane triacrylate, a bisphenol A dimethacrylate, a tripropyleneglycol diacrylate, a pentaerythritol tetraacrylate, a 2-(2-ethoxyethoxy)ethylacrylate, a tris(2-hydroxyethyl)isocyanurate triacrylate, an isobornyl acrylate, and mixtures thereof.

24. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the polymerization modifier includes isobornyl acrylate.

25. (Withdrawn) The liquid stereolithography resin of claim 1, further comprising a stabilizer.

26. (Withdrawn) The liquid stereolithography resin of claim 25, wherein the stabilizer is selected from the group consisting of ~~Tinuvin-292~~ (bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate and 1-methyl-10-(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate), ~~Tinuvin-765~~ (bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate), MEQH (4-methoxyphenol), ~~LA-32~~ 2-(2'-hydroxy-5'-methylphenyl)benzotriazole, ~~LA-82~~ 1,2,2,6,6-pentamethyl-4-piperidyl methacrylate and ~~Chimassorb-81~~ (2-hydroxy-4-octyloxybenzophenone).

27. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~Sartomer~~ CN964, the first acrylate monomer is ~~Sartomer-SR454~~ ethoxylated (3) trimethylolpropane acrylate, and the polymerization modifier is selected from the group consisting of ~~Sartomer-SR506~~ isobornyl acrylate, ~~Sartomer-SR494~~ ethoxylated (5) pentaerythritol tetraacrylate, ~~Sartomer~~ CN965, ~~Sartomer-SR368~~ tris-(2-hydroxyethyl)isocyanurate triacrylate, and mixtures thereof.

28. (Withdrawn) The liquid stereolithography resin of claim 27, wherein the resin includes 5-35 weight % ~~Sartomer~~ CN964 and 0.5-25 weight % ~~Sartomer-SR454~~ ethoxylated (3) trimethylolpropane acrylate.

29. (Withdrawn) The liquid stereolithography resin of claim 28, wherein the resin includes 0.5-20 weight % ~~Sartomer SR506~~ isobornyl acrylate.

30. (Withdrawn) The liquid stereolithography resin of claim 28, wherein the resin includes 15-45 weight % ~~Sartomer SR494~~ ethoxylated (5) pentaerythritol tetraacrylate.

31. (Withdrawn) The liquid stereolithography resin of claim 28, wherein the resin includes 0.5-25 weight % ~~Sartomer~~ CN965.

32. (Withdrawn) The liquid stereolithography resin of claim 28, wherein the resin includes 5-35 weight % ~~Sartomer SR368~~ tris-(2-hydroxyethyl)isocyanurate triacrylate.

33. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~Sartomer~~ CN963, the first acrylate monomer is ~~Sartomer SR306~~ tripropylene glycol diacrylate, and the polymerization modifier is selected from the group of ~~Sartomer~~ CN970H75, ~~Sartomer CD540~~ ethoxylated (4) bisphenol A dimethacrylate, ~~Sartomer SR506~~ isobornyl acrylate, and mixtures thereof.

34. (Withdrawn) The liquid stereolithography resin of claim 33, wherein the resin includes 40-70 weight % ~~Sartomer~~ CN963, and 5-35 weight % ~~Sartomer SR306~~ tripropylene glycol diacrylate.

35. (Withdrawn) The liquid stereolithography resin of claim 34, wherein the resin includes 0.5-15 weight % ~~Sartomer~~ CN970H75.

36. (Withdrawn) The liquid stereolithography resin of claim 34, wherein the resin includes 0.5-15 weight % ~~Sartomer CD540~~ ethoxylated (4) bisphenol A dimethacrylate.

37. (Withdrawn) The liquid stereolithography resin of claim 34, wherein the resin includes 5-35 weight % ~~Sartomer SR506~~ isobornyl acrylate.

38. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~Sartomer~~ CN966, the first acrylate monomer is ~~Sartomer SR506~~ isobornyl acrylate, and the polymerization modifier is selected from the group consisting of ~~Sartomer SR506~~ isobornyl acrylate, ~~Sartomer CD540~~ ethoxylated (4) bisphenol A dimethyacrylate, and mixtures thereof.

39. (Withdrawn) The liquid stereolithography resin of claim 38, wherein the resin includes 10-40 weight % ~~Sartomer~~ CN966 and 0.5-25 weight % ~~Sartomer SR506~~ isobornyl acrylate.

40. (Withdrawn) The liquid stereolithography resin of claim 38, wherein the resin includes 6-35 weight % ~~Sartomer SR506~~ isobornyl acrylate.

41. (Withdrawn) The liquid stereolithography resin of claim 38, wherein the resin includes 25-55 weight % ~~Sartomer CD540~~ ethoxylated (4) bisphenol A dimethyacrylate.

42. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~Sartomer~~ CN990, the first acrylate monomer is ~~Sartomer SR506~~ isobornyl acrylate, and the polymerization modifier is selected from the group consisting of ~~Sartomer~~ CN131, ~~BYK Chemie~~ ~~BYK UV 3500~~ a polyether modified acryl functional polydimethylsiloxane, and mixtures thereof.

43. (Withdrawn) The liquid stereolithography resin of claim 42, wherein the resin includes 50-80 weight % ~~Sartomer~~ CN990 and 0.5-20 weight % ~~Sartomer SR506~~ isobornyl acrylate.

44. (Withdrawn) The liquid stereolithography resin of claim 43, wherein the resin includes 5-35 weight % ~~Sartomer~~ CN131.

45. (Withdrawn) The liquid stereolithography resin of claim 43, wherein the resin includes 0.5-15 weight % ~~BYK-Chemie BYK-UV 3500~~ a polyether modified acryl functional polydimethylsiloxane.

46. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~Sartomer~~ CN973, the first acrylate monomer is ~~Sartomer SR506~~ isobornyl acrylate, and the polymerization modifier is ~~Sartomer SR506~~ isobornyl acrylate.

47. (Withdrawn) The liquid stereolithography resin of claim 46, wherein the resin includes 45-75 weight % ~~Sartomer~~ CN973 and 10-70 weight % ~~Sartomer SR506~~ isobornyl acrylate.

48. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~Sartomer~~ CN963, the first acrylate monomer is ~~Sartomer SR306~~ tripropylene glycol diacrylate, and the polymerization modifier is selected from the group consisting of ~~Sartomer~~ CN2400, ~~Sartomer SR506~~ isobornyl acrylate, and mixtures thereof.

49. (Withdrawn) The liquid stereolithography resin of claim 48, wherein the resin includes 20-50 weight % ~~Sartomer~~ CN963 and 0.5-25 weight % ~~Sartomer SR306~~ tripropylene glycol diacrylate.

50. (Withdrawn) The liquid stereolithography resin of claim 49, wherein the resin includes 10-40 weight % ~~Sartomer~~ CN2400.

51. (Withdrawn) The liquid stereolithography resin of claim 49, wherein the resin includes 10-40 weight % ~~Sartomer SR506~~ isobornyl acrylate.

52. (Withdrawn) The liquid stereolithography resin of claim 1, wherein the first urethane acrylate oligomer is ~~Sartomer~~ CN966, the first acrylate monomer is ~~Sartomer SR506~~

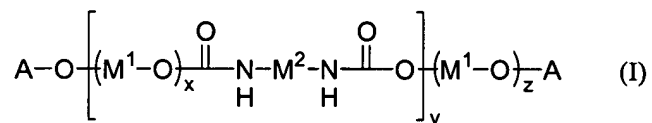
isobornyl acrylate, and the polymerization modifier is selected from the group consisting of ~~Sartomer~~ CN131 and ~~Sartomer SR506~~ isobornyl acrylate.

53. (Withdrawn) The liquid stereolithography resin of claim 52, wherein the resin includes 35-60 weight % ~~Sartomer~~ CN966 and 10-25 weight % ~~Sartomer SR506~~ isobornyl acrylate.

54. (Withdrawn) The liquid stereolithography resin of claim 52, wherein the resin includes 10-45 weight % ~~Sartomer SR506~~ isobornyl acrylate.

55. (Withdrawn) The liquid stereolithography resin of claim 52, wherein the resin includes 5-35 weight % ~~Sartomer~~ CN131.

56. (Withdrawn) A liquid stereolithography resin comprising:
a first urethane acrylate oligomer having formula (I):

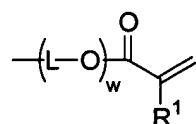


wherein

each M^1 is, independently, an alkylene, an acylalkylene, an oxyalkylene, an arylene, an acylarylene, or an oxyarylene, M^1 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each M^2 is, independently, an alkylene or an arylene, M^2 being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, silicone, aryl, or aralkyl,

each A, independently, has the formula:

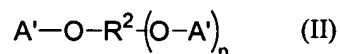


wherein R^1 is hydrogen or lower alkyl, each L is, independently, C_1 - C_4 alkyl, and w is an integer

ranging from 0 to 20, and

x is a positive integer less than 40, y is a positive integer less than 100, z is a positive integer less than 40, and w, x, y, and z together are selected such that the molecular weight of the first urethane acrylate oligomer is less than 20,000;

a first acrylate monomer having formula (II):

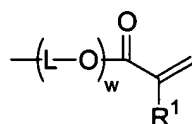


wherein

R² is a monovalent or polyvalent moiety selected from the group consisting of a C₁-C₁₂ aliphatic group, an aromatic group, and a poly(C₁-C₄ branched or unbranched alkyl ether), R² being optionally substituted with alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, acyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, aryl, or aralkyl,

n is an integer ranging from 0 to 5, and

each A' has the formula:



wherein R¹ is hydrogen or lower alkyl, each L independently is C₁-C₄ alkyl, and w is an integer ranging from 0 to 20; and

a polymerization modifier including a second urethane acrylate oligomer, a second acrylate monomer, or a combination thereof.

57. (Withdrawn) The liquid stereolithography resin of claim 56, further comprising a photoinitiator and a stabilizer.

58-67. (Cancelled)